WIRELESS TECHNOLOGY FOR LED DIMMING BY USING SMART PHONE

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ABSTRACT

In this paper, an LED dimming control system using wireless communication system is proposed. The proposed system involves a LED bar, a light dimming control app for smart phone and a Bluetooth module for remote control of LED dimming. This project also includes system oriented monitoring of home lighting .The experimental results show that smart phone is a good medium for home lighting applications. Moreover, smart phone APPs are very easy to connect, therefore offers advantages like product interoperability, vendor independency and accessibility to boarder markets. Our proposed system also contains an automatic mode in which the LED brightness will be controlled automatically by using an LDR.

Keywords— *Bluetooth, Smart Phone, LED*

I. INTRODUCTION

In recent times, the exhaustion of fossil fuel and the issue of climate change have attracted public attention on energy management and environment protection. Governments and some professional associations have successfully regulated the specification for the "GREEN" products and generated the certified mechanism. As energy consumption on lighting rises regularly, lighting equipment which is environmental friendly and possesses high energy efficiency becomes popular. Energy and cost will then be saved through the enhancement of lighting efficiency. Among all lighting individuals, Light Emitting Diode is one of the most promising light sources because LED's provide several unique features like small in size, directional light emission, cold temperature operation and controllability. With the development of several technologies, LED can now be applied on various areas widely. Applications from household to indoor lighting are common in the daily life. The smart phones and tablets have used in a new life style for people. Many control systems have been developed and integrated with applications of smart phones and tablets. Users can download the app and they can remotely control the household appliance which is very different from traditional ways.

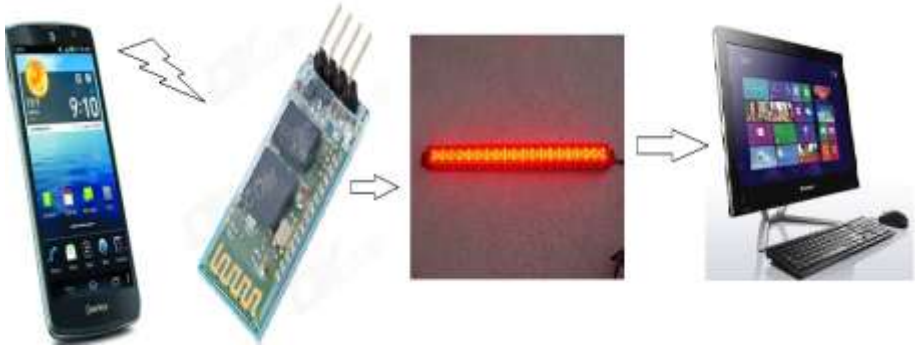

Fig.1. System Diagram

In this paper, an LED dimming control and monitoring system based on wireless Bluetooth network is proposed. Fig.1 indicates the system diagram. With the help of the connection between Bluetooth in the smart phone and the Bluetooth module signals and the commands are transmitted wirelessly which are used to monitor and control the brightness of LED bar and a system is connected the controller which is connected to the Bluetooth module to monitor and record the details of the project. One can control the brightness and colour of LED bar by using App integrated on the smart phone or tablet.

II. APP DESIGN

The APP on the smart phone is shown in Fig.2. When we open the APP, then a dialog box will pop up to ask for turning on the Bluetooth, otherwise the APP will be closed. Later it automatically detects whether another Bluetooth is available or not.

The controlling of LED brightness cannot be done if the Bluetooth module is not connected to the smart phone. In fig.3 when we click on the "CONNECTION" button, the list will show all the connections that have been connected and new equipment will be found. We have to select the Bluetooth module to be connected. The status and the information will be shown next to main title and all control slides will be active.

After connecting to Bluetooth, one can slide the control bars to adjust the brightness of LED bar. Fig.4 shows the operation scenario of APP and the circuits for dimming 10% red, 40% green and 60% blue.

Fig.2. Main APP in the Smart Phone

Finally, the total information regarding LED lighting control is monitored in a PC as shown in fig.2.

III. HARDWARE CONFIGURATIONS & WORKING

The block diagram of the presented system is drawn in fig.5. This block diagram contains a ARM7 LPC2148 specification board which will interface with the Bluetooth module, PC, an LDR and LED bar. This micro controller board will receive the RGB LED brightness control input from Bluetooth module which will come from Smart phone. And then according to the input from smart phone the controller adjusts the brightness of RGB LED bar and then it transfers the details of dimming of LED to a PC through UART.

IV. BLOCK DIAGRAM

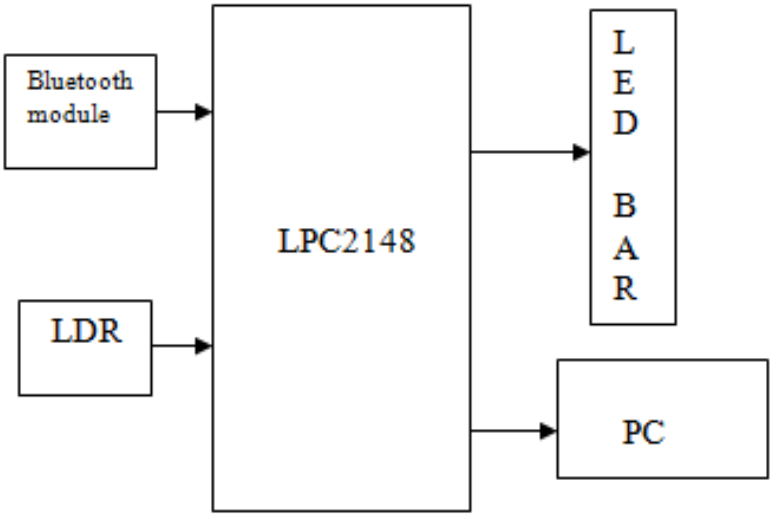

Fig.3. Block diagram of the system

V. FLOWCHARTS

The flowcharts for the project to write the code are given below.

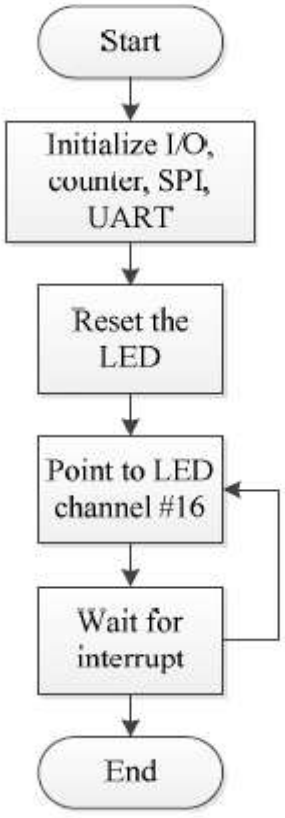

Fig. 4(1) Flowchart of Main Code

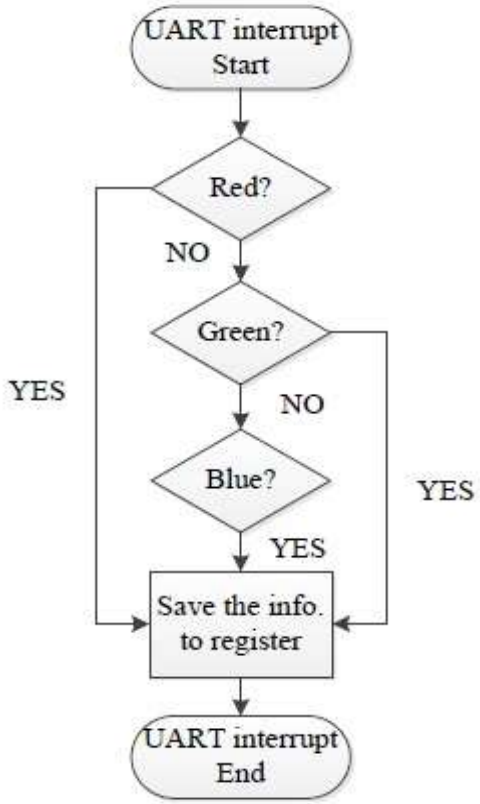

Fig. 4(2) Flowchart of UART Interrupt

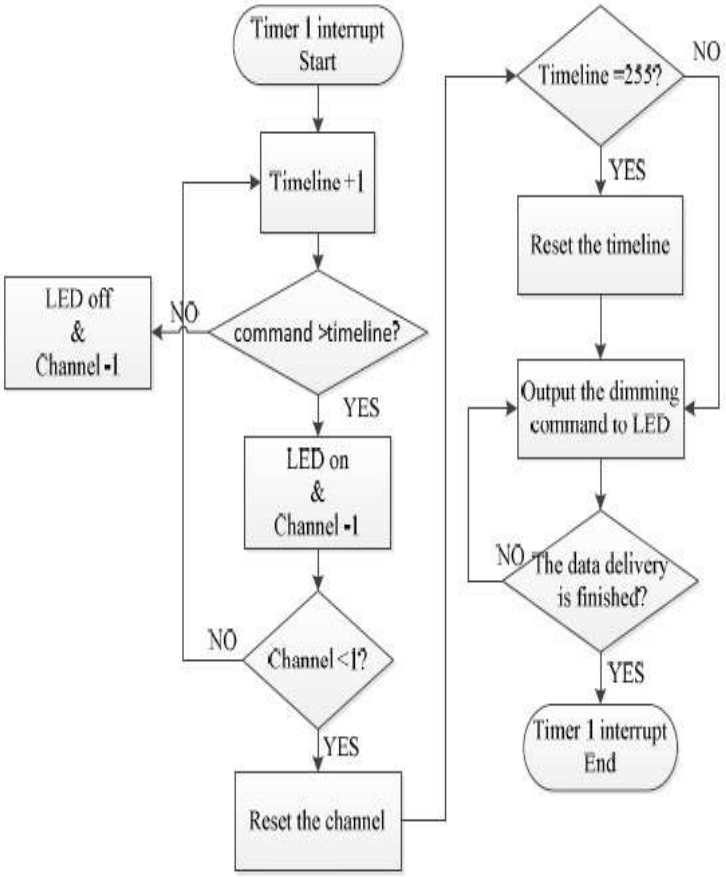

Fig. 4(3) Flowchart of LED Dimming Control

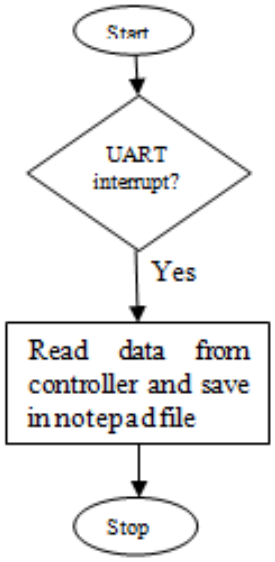

Fig. 4(4) Flowchart of PC connection

VI. AUTOMATIC MODE

In this mode the bright of the led bar is controlled automatically depending on a LDR. In this also the brightness is controlled at four levels. The algorithm of the automatic mode is shown below.

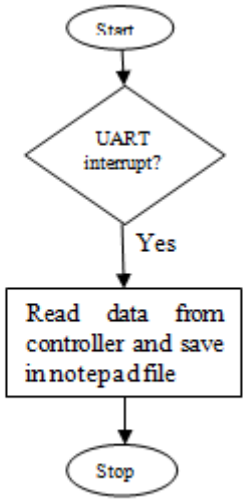

Fig. 4(4) Flowchart of PC connection

VII. RESULTS

When we switched on our project micro controller sends instruction commands to the Bluetooth and LCD. When, user connected the android mobile phone with Bluetooth module, controller weights for the commands from the android phone.

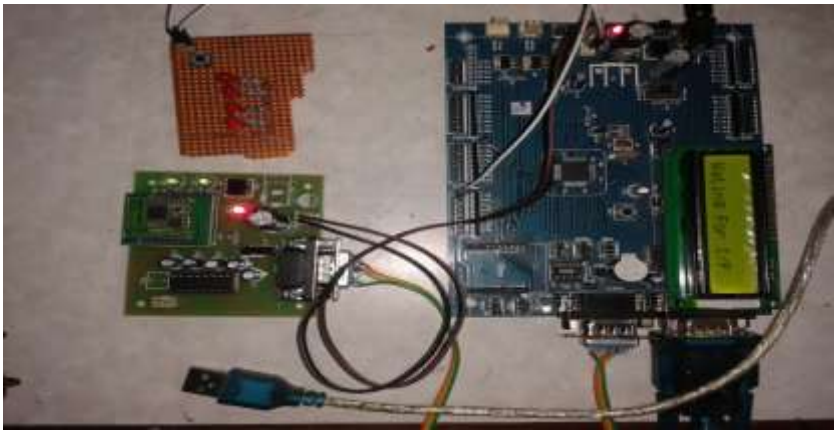

Fig: 6 Waiting For Input from Bluetooth Module

Fig: 7 LEDS Glowing With 100% Intensity

When command received from the Bluetooth module to controller changed, the intensity of the LED lights also changes. At the same time controller sends the status of the LED lights to the PC which is connected to the com ports and the status is stored in the text file which is stored in PC for further application and improvements.

VIII. CONCLUSION

A wireless LED dimming control system based on smart phone is detailed as proposed. With the connection of Bluetooth, one can control the lighting of LED's by using smart phone or tablet. Based on the results, the command from smart phone or tablet is transmitted to LED bar and the LED light can be lighted accordingly.

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